PB87-231684

Pesticide Fact Sheet Number 138: Isazophos

(U.S.) Environmental Protection Agency
Washington, DC

25 Jun 87

U.S. Department of Commerce
National Technical Information Service
NTIS

PB87-231684

REPORT DOCUMENTATION PAGE	1. REPORT NO.	2.	

4. Title and Subtitle: EPA Pesticide Fact Sheets - ISAZOPHOS No. 138

5. Report Date: Issued 6/25/87

6.

7. Author(s): EPA, Office of Pesticide Programs, Registration Division

8. Performing Organization Rept. No.: 540/FS-87- 211

9. Performing Organization Name and Address:
US Environmental Protection Agency
Office of Pesticide Programs
Registration Division, TS-767C
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Washington, D.C. 20460

10. Project/Task/Work Unit No.

11. Contract(C) or Grant(G) No.
(C)
(G)

12. Sponsoring Organization Name and Address:
Same as #9

13. Type of Report & Period Covered

14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

This document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or group of pesticides. A Fact Sheet is issued after one of the following actions has occurred.

1. Issuance or reissuance of a registration standard,
2. Issuance of each special review document,
3. Registration of a significantly changed use pattern,
4. Registration of a new chemical, or
5. An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

17. Document Analysis a. Descriptors

Pesticides, regulations, Chemical Information Fact Sheet, Use Patterns, Science Findings

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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U.S. DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL
INFORMATION SERVICE
SPRINGFIELD, VA 22161

18. Availability Statement:	19. Security Class (This Report)	21. No. of Pages
Publicly Available	Unclassified	5
	20. Security Class (This Page) Unclassified	22. Price

United States
Environmental Protection
Agency

Office of Pesticides and Toxic Substances
Office of Pesticide Programs (TS-766C)
Washington, DC 20460

EPA

Pesticide Fact Sheet

Name of Chemical: Isazophos
Reason for Issuance: Registration of New Chemical
Date Issued: June 25, 1987
Fact Sheet Number: 138

1. Description of Chemical

Generic name: 0-(5-chloro-1-[methylethyl]-1H-1,2,4-triazol-3-yl) 0,0-diethyl phosphorothioate

Common name: Isazophos (BSI)

Trade name: CGA-12223, Triumph

EPA Shaughnessy code: 124101

Chemical abstracts service (CAS) number: 42509-80-8

Year of initial registration: 1987

Pesticide type: Insecticide

Chemical family: Organophosphate

U.S. Producer: None

Foreign Producer: Ciba-geigy, Switzerland

2. Use Patterns and Formulations

Application sites: lawns

Types of formulations: liquid

Types/methods of application: ground spray

Application rates: 0.75 to 1.5 fl. oz. of product in a minimum of 3 gals. of water per 1,000 sq. ft. of lawn. A maximum of 2.0 lbs a.i./A per year may be applied.

Usual Carriers: xylene

3. Science Findings

Adequate studies are available to assess the toxicological and environmental hazards of both the technical product and the end-use emulsifiable concentrate product for use on lawns. No toxicological or environmental hazards of concern were identified from use of these products when used according to prescribed label directions.

Chemical characteristics

Physical state: slightly viscous liquid

Odor: characteristic organophosphorus odor

Color: pure material: colorless; technical material: yellow

Boiling point: 100°C at 0.001 mbar

Specific gravity: 1.22 g/cm^3 at 20°C

Solubility: water: 150ppm at 20°C

Vapor pressure: 4.3×10^{-5} mbar at 20°C

Miscibility: miscible with methanol, chloroform, dichloromethane, hexane, toluene, xylene.

Empirical formula: $C_9H_{17}ClN_3O_3PS$

Toxicology

Acute oral toxicity: from 33 mg/kg to 84 mg/kg in both male and female rats (Tox Cat. I)

Acute inhalation: from 0.245^C to 1.89^C for both male and female rats (Tox Cat. I)

Acute dermal (rabbit): intact: 870 mg/kg
abraded: 571 mg/kg (Tox Cat. II)

Primary eye irritation: caused slight eye irritation in rabbits which was found to be reversible within 7 days (Tox Cat. III)

Primary dermal irritation: caused slight dermal irritation in rabbits (Tox Cat. IV)

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The no-observed-effect levels (NOEL) for the chemical with respect to cholinesterase inhibition are as follows:

Study	ppm	mg/kg
90-day rat feeding	20	0.1
6-month dog feeding	0.05	0.0125
21-day dermal in rabbits	----	0.1

Acute delayed neurotoxicity: The submitted study shows that the chemical does not induce delayed neurotoxicity in female chickens at a dose of approximately 25.4 mg/kg.

Teratogenicity: The NOEL for maternal toxicity in the rat and rabbit were 6 mg/kg/day and 5 mg/kg/day, respectively. The effects were clinical signs of cholinesterase inhibition. Fetotoxicity (runts) were observed in pregnant rats given the highest dose tested (9 mg/kg). No teratogenic effects were observed in the submitted studies.

Physiological and Biochemical Behavioral Characteristics:

Mechanism of pesticidal action: cholinesterase inhibitor

Metabolism and Persistence in Plants and Animals

The metabolism studies which were submitted suggest that CGA 12223 is almost completely excreted within 24 hours after dosing of rats (93 to 97%). The primary route of excretion is the urine (approximately 99% of the total excreted). The phosphorus-triazolyl ester bond is cleaved, and the major portion of excreted residues in the urine consists of glucuronic and sulfuric acid conjugates of the triazole moiety or free triazole.

Environmental Characteristics

Studies show CGA-12223 to be subject to relatively rapid degradation by both hydrolysis and photolysis in aqueous solution. The hydrolysis halflife at neutral pH is 48 days, while the half-life for photolysis is approximately six days. The major degradation product (CGA-17193) of both reactions is the same and results from cleavage of the phosphorus ester bond to produce the resulting hydroxy triazole. Metabolism studies indicate significant degradation of CGA-12223 in soil, with a half-life of approximately 14 days under field conditions. As in the hydrolysis and photolysis studies, the major degradation product in the soil metabolism studies was CGA-17193. CGA-12223 did not significantly affect the growth of soil microorganisms or, specifically, cellulose-decomposing microorganisms and did not alter soil nitrification. Soil column leaching studies indicate that the chemical has a high potential to leach in representative bare soils. Dissipation from turf was found to be relatively rapid, with a half-life of approximately 13 days. An in-house Pesticide Root Zone Model (PRZM) simulation of Triumph used on turf shows that the chemical has little, if any potential to leach, when used on turf.

Bioaccumulation ratios in catfish exposed to a soil/water system were very low, with maximum values of 11X in the edible portion after one day of exposure and 44X in the whole fish after 14 days.

Ecological characteristics:

Avian acute oral toxicity (mallard duck) = 61 mg/kg

Avian dietary toxicity (mallard duck) = 244 ppm
(bobwhite quail) = 81 ppm

Fish acute toxicity (rainbow trout) = .00636 ppm
(bluegill sunfish) = .00383 ppm
(flathead minnow) = 0.138 ppm

Aquatic invertebrate toxicity (48 hr. - Daphnia magna) = 1.40 ppb

Avian reproduction: No reproductive effects at highest level tested (30 ppm) in both mallard duck and bobwhite quail.

Toxicity to estuarine and marine animals:
96 hr.; sheepshead minnow = 6.02 ppb

Embryo-Larvae and life-cycle:
21-day life cycle (Daphnia magna) = MATC
> 0.198 and > 0.495 ug/L
early-life stage (fathead minnow) = MATC
> 2.5 and > 6.3 ppb

Tolerance assessments:

There are no tolerances for the chemical. The use on lawns is a non-food use.

4. Summary of Regulatory Position and Required Unique Labeling

Use classification - use on lawns restricted to use only by certified applications or persons under their direct supervision. Restriction is due to avian fish and aquatic organism toxicity.

Formulation: 46.8% emulsifiable concentrate.

An assessment of potential exposure to humans re-entering lawns after application of the pesticide was conducted. The direct comparison of dermal exposure estimates to a subchronic dermal toxicity NOEL provides margin of safety (MOS) ratios of 51.3, 25.6, and 17.3 for 1-, 2-, or 3-hour exposures.

Based on data submitted in support of a re-entry interval, the following restriction is required on the labeling for use of the chemical on lawns:

> Do not allow children or pets on the grass on the day of treatment until 1/2 inch of water has been applied and the grass is dry.

Based on results of the PRZM modeling for the use of the chemical on turf, the following label restriction is required for use of the product on lawns:

> Do not use on sandy soil.

5. Summary of major data gaps

There are no data gaps for the registration of the chemical on lawns.

6. Contact person at EPA

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